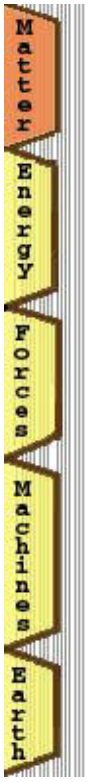
Sassafras Sublime Surprise!



Standard 3240-01 Students will observe and describe chemical and physical change.

Objective
3240-0102 Analyze factors that influence chemical and physical change.

Intended Learning Outcomes
1a. Make observations and measurements.
2e. Analyze data and draw warranted inferences.

TEACHER INSTRUCTIONS

Prepare your class with a demonstration or class activity to show sublimation and/or solubility of a gas in a liquid.

This activity is done as a demonstration!

Materials:
5 gallon container (those orange Rubbermaid ones with a spigot are perfect)
5 pounds sugar
5 gallons water
1 bottle rootbeer extract
5 pounds or so of dry ice

Procedure
Put water in container. If you can use cold water, that's great. Add sugar and extract. Mix **well**. This makes enough for about **200** *3 oz.* cups of rootbeer. At this point it would be a good idea to pour out enough rootbeer for one or two classes into a smaller container and carbonate the rootbeer for one or two classes at a time. You need about 1 pound of dry ice per gallon of rootbeer mix. When you are ready, add the dry ice to the rootbeer mixture. The students will enjoy watching it bubble, etc. and you can use the wait time to discuss sublimation and solubility of gas in a liquid. Serve the rootbeer in 3 oz.cups and have the students answer the following questions while they drink.

Suggested questions:
1. How do you know that the dry ice sublimes and doesn't go through the liquid phase first?
2. What is the gas that dry ice emits?
3. What would be another way to carbonate a drink?
4. You are drinking an acid in your cup. How did it become an acid?
5. Has this changed your attitude about acids? Explain your answer.

As a class activity: *STUDENTS MAKE THEIR OWN INDIVIDUAL CUP OF ROOTBEER SO THEY GET PRACTICE IN CONVERSIONS AND MEASURING AS WELL AS LEARNING ABOUT SUBLIMATION*

Materials

7 gallon container (those orange **10 Gallon** Rubbermaid ones with a spigot are perfect)
5 pounds sugar (if you don't have a container this large, just reduce the quanities proportionally)
5 gallons water
1 bottle rootbeer extract
5 pounds or so of dry ice
graduated cylinders
paper towel
3 oz cups (one per person)
balances
spoons or straws to stir with

Procedure
1. Mix water and rootbeer extract together in a five gallon container.
2. Give students a 3 oz cup
3. Have students figure out how much rootbeer/water mixture they need to put in their cup . You can give them the following conversions:
454 grams = 1 pound
1 gallon = about 20,000 ml (or one liter =1,000ml, one quart is about 1 liter, one gallon = 4 quarts, 1 liter = 32 ounces if you're brave)
4. From the above conversions, students should be able to figure out that they need 93 ml of the water/rootbeer mixture, 10.7 grams of sugar, and 10.7 or so grams of dry ice.
5. Have students measure water/rootbeer mixture into their cup, measure the sugar, add to water mixture and stir, and

then add dry ice to their cup.
6. After discussing sublimation and solubility of gas in a liquid, have students answer the following questions on their own paper.

Safety concerns:


Teachers and students, be sure to keep all Chemical Safety Rules that are specified by your teacher and in all general laboratory experiences.

Conclusion questions
1. How do you know that the dry ice sublimes and doesn't go through the liquid phase first?
2. What is the gas that dry ice emits?
3. What would be another way to carbonate a drink?
4. You are currently drinking an acid in your cup. How did it get that way?
5. Has this changed your attitude about acids? Explain your answer.

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